ice began to loosen along the shores but remained solid in the channel. The steamer "Algomah" arrived on the 17th and reported the ice to be solid or dammed from McGulpin's Point to the main-land. The steamers "City of Cleveland" and "Flora" arrived at Mackinaw Island on the 21st; on this date the north channel was clear of ice. The propeller "Atlantic," the first boat of the season, passed through the south passage on the 25th. On the 28th the straits were open to navigation.

Little Bay de Noquet.—Escanaba, Michigan: the bay became clear of ice on the 24th and the tug "Shipman" arrived on the 25th. The first passenger steamer of the season arrived from Green Bay on the 26th.

Saint Clair river.—Port Huron, Michigan: floating ice on the 3d and 4th and from the 6th to 9th; ice dam on the 13th, the ice measuring twenty-nine inches in thickness. The ice in Black river broke up on the 8th.

Detroit river.—Detroit, Michigan: drift-ice in river on 1st, 2d, 3d, 5th, 7th, 8th, and from 11th to 17th.

Lake Superior.—Marquette, Michigan, 19th: ice left the harbor during the morning of this date.

Embarras and Wolf rivers.—Embarras, Wisconsin: ice in the Embarras and Wolf rivers broke up on the 11th.

Red River of the North.—Moorhead, Minnesota: the ice broke up on the 9th, and on the 16th, the river was clear of ice. On the 19th, the steamer "Pluck" left for points down the river, being the first boat of the season.

Saint Vincent, Minnesota: the ice broke up on the 19th.

Mississipi river.—La Crosse, Wisconsin, 4th: the ice broke up and formed a dam below the city, which broke during the morning of the 5th. The first steamer ("Minneapolis") of the season arrived from Saint Louis on the 6th.

Saint Paul, Minnesota, 6th: the ice-dam which formed below Wabasba street broke during the afternoon, the ice passing away without damage. The first steamer ("Mary Norton") from Saint Louis arrived on the 20th.

Missouri river.—Fort Stevenson, Dakota: on the 9th, the ice broke along the shores, but remained firm in the channel. During the evening of the 10th, the ice broke up, but became dammed on the afternoon of the 11th. During the 11th and 12th the river rose rapidly, the ice causing considerable damage. The ice-dam broke during the evening of the 12th. The first steamer ("Eclipse") of the season departed on the 18th.

Tobacco Garden, Dakota, 15th: navigation resumed; first departure on this date.

Bismarck, Dakota, 10th: the ice broke at 2.30 p. m. of this date, and passed out without damage.

Fort Bennett, Dakota, 16th: the steamer "Roseburg," the first boat of the season, arrived at this date.

Fort Buford, Dakota: ice broke in the river at this place on the 10th.

Fort Sully, Dakota: the first steamer of the season arrived from the lower Missouri on the 16th.

Miscellaneous.—Pointe de Lac, Province of Quebec, 16th: the ice on Lake Saint Petre is still solid. At Three rivers, Province of Quebec, the ice was firm on the 16th, and at Batiscan, Province of Quebec, the ice broke up on that date.

Saint John's, Newfoundland, 28th: the Mississippi and Dominion Company's steamer "Ontario" passed Cape Race on the evening of the 27th, being the first ocean steamer sighted this season, with the exception of boats calling at Saint John's.

Bangor, Maine: the ice in Kenauskeag springs passed out during the night of the 9th.

Wicklow, Dakota: ice began to break up on the 14th and disappeared from the lake on the 17th.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at the Signal Service stations, with the average depth at which the observations were made, and the mean temperature of the air at the various stations, are given in the table below. Observations were interrupted by ice at the following stations: Mackinaw City, Michigan, from 1st, to 17th, and from 21st to 30th; Milwaukee, Wisconsin, from 1st to 15th; Buffalo, New York, from 1st to 6th; Escanaba, Michigan, from 1st to 18th; Chicago, Illinois, from 1st to 8th; Cleveland, Ohio, from 1st to 8th; Marquette, Michigan, from 1st to 18th; Detroit, Michigan, 1st, 2d, 13th, 14th, 15th; Duluth, Minnesota, from 1st to 7th. At Chicago, the thermometer was broken on the 25th, and no observations were made after that date.

The highest observed temperatures of water during April, 1883, compared with those of April, 1882, show a decrease of from 1° to 9° at stations along the Atlantic coast, between Eastport, Maine, and Jacksonville, Florida, with the exception of the latter station, and Chincoteague, Virginia, where they were 1° higher than in April, 1882. A comparison of the lowest observed water temperatures at stations along the Atlantic coast for the same periods, shows that, with the exception of Sandy Hook, New Jersey, and Portland, Maine, where they are a fraction of a degree higher, the temperatures are from 1° to 12°.5 lower than those of last year.

Temperature of Water for April, 1883.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.				
	°	°	°	ft.	in.	°
Alpena, Michigan*	41.3	30.5	10.8	10	11	35.1
Augusta, Georgia	70.0	58.0	12.0	13	0	64.5
Baltimore, Maryland	54.5	41.5	13.0	9	10	52.1
Block Island, Rhode Island	45.7	36.3	9.4	8	11	42.6
Boston, Massachusetts	46.1	34.2	11.9	20	1	44.3
Buffalo, New York*	50.3	33.4	16.9	9	8	40.2
Cedar Keys, Florida	82.0	68.0	14.0	9	10	72.6
Charleston, South Carolina	68.0	57.9	10.1	40	0	64.0
Chicago, Illinois*	50.9	40.2	10.7	6	11	45.6
Chincoteague, Virginia	60.0	42.0	18.0	5	11	49.1
Cleveland, Ohio*	46.1	33.1	13.0	14	0	44.0
Detroit, Michigan*	47.5	34.0	13.5	23	5	46.2
Delaware Breakwater, Delaware	53.9	39.4	14.5	9	4	47.3
Duluth, Minnesota*	42.3	34.2	8.1	15	4	40.3
Eastport, Maine	36.5	32.6	3.9	16	5	38.0
Escanaba, Michigan*	39.5	34.0	5.5	15	0	36.2
Galveston, Texas	75.0	61.0	14.0	13	8	70.6
Grand Haven, Michigan	56.1	37.1	19.0	19	0	44.4
Indianola, Texas	77.5	64.5	13.0	9	5	71.3
Jacksonville, Florida	77.0	65.0	12.0	18	0	70.1
Key West, Florida	84.3	74.8	9.5	16	9	79.2
Mackinaw City, Michigan*	37.2	33.2	4.0	13	0	35.9
Marquette, Michigan*	38.0	37.0	1.0	9	10	36.9
Milwaukee, Wisconsin*	47.1	42.1	5.0	8	0	43.0
Mobile, Alabama	72.5	63.0	9.5	16	10	68.8
New Haven, Connecticut	50.3	36.1	14.2	14	10	44.2
New London, Connecticut	45.0	38.0	7.0	12	7	45.2
New York City	40.7	37.2	9.5	16	10	46.6
Norfolk, Virginia	61.0	47.0	14.0	17	0	55.8
Pensacola, Florida	75.8	65.9	9.9	18	3	68.9
Portland, Maine	40.7	34.5	6.2	18	5	44.7
Portland, Oregon	51.0	45.2	5.8	48	7	49.2
Provincetown, Massachusetts	46.5	34.5	12.0	14	0	41.8
Punta Rassa, Florida	85.0	76.6	8.4	11	4	75.1
Sandy Hook, New Jersey	46.5	42.8	3.7	1	6	46.6
San Francisco, California	56.5	52.4	4.1	29	1	52.4
Savannah, Georgia	68.4	57.0	11.4	12	11	67.7
Smithville, North Carolina	63.0	58.0	5.0	10	0	59.2
Toledo, Ohio	58.3	37.8	20.5	11	3	47.4
Wilmington, North Carolina	65.5	49.0	16.5	13	0	61.3

*Observations incomplete. See text.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The auroral display which occurred during the evening of April 3d, was generally observed in Canada, New England, the lower lake region, and at a few of the most northerly stations in the middle Atlantic states. At most of the stations where this display was observed, it was of ordinary brilliancy. At Eastport, Maine, it was visible from 7 p. m. until the early morning of the 4th, and consisted of a low arch extending from north-northwest to northeast. Several streamers of whitish color tinged with crimson appeared between the north and northeast.

At Freehold, New Jersey, this display was observed at 7.30 p. m., in the form of a white glow, with several long narrow streamers. It faded away at 8.30 and reappeared at 10 p. m. The only western stations reporting auroras on the evening of the 3d were Saint Vincent, Minnesota, and Dayton, Washington Territory. At the latter station, it was described as